stand attached to the middle of the balancing board, so that the lead is about 5 feet above the board. The globe is provided with tubular apertures, not shown in the figure, to allow it to be filled with saturated and nucleus-laden air at pleasure; but during an experiment these apertures are closed. It is also provided with wires, *W*, led through an india rubber bung, and connected in the interior of the globe by means of a fine platinum wire, to allow heat to be supplied to the air at pleasure by passing an electric current through the fine wire.

When the globe has been filled with suitable air, and the apertures closed, any motion of the board diminishes or increases the pressure in the interior by the motion of the mercury vessel. The increase or diminution of pressure tends to resist the motion of the board, and by adjusting the positions of the counterpoise and the lead weight, the arrangement can be made to balance just within the limits of stability, when the elasticity of the enclosed air is taken into account. When this adjustment is made, it is clear that a slight motion of the board in the direction of increasing the volume of the enclosed air throws over the lead weight toward the same side as the globe, and brings to bear a largely increased moment of forces tending to continue the expansion; so that the ultimate expansion resulting from any cause tending to depress the balance on the globe side produces a rarefaction depending on the degree of dynamical instability of the balance. Such a cause arises when the air in the globe is slightly warmed by passing a current through the wire. If the mercury vessel were fixed, the heating would produce increase of pressure in the closed space, and consequently increase of pressure in the mercury surface supported by the board. As, however, the balanced vessel is movable, the balance comes over, and then the dynamical instability causes expansion, determined not solely by the amount of heat which originated the motion, but by the loads on the balance and their position.

The success of the experiment, for the demonstration of the production of a cloud—i. e. a diminution of temperature—on heating, depends upon the proper selection of the area of the tube in comparison with the volume of the globe. I have found a 4-inch globe with a 1½-inch tube give completely satisfactory results. The counterpoising weights are about seven pounds on each side, and the lead weight with iron stand supporting it, perhaps fifteen pounds. Under these conditions, with the globe filled with saturated air and closed, and the mercury vessel properly counterpoised, the commencement of heating at once determines a depression of the board on the globe side, a rarefaction corresponding to about three-quarters of an inch of mercury and an abundant cloud. The experiment can be repeated with the same air, after readjusting the balance, until the exhaustion of nuclei for the deposit of globules makes the arrangement insensitive. Its activity can always be restored by refilling it with suitable air.

The degree of instability of the balance corresponds to the temperature gradient for height in nature. I have not yet formed an estimate of the temperature gradient to which my arrangement of the apparatus would correspond. But the analogy between the two is formally correct, and with a slight modification of the apparatus the equivalent temperature gradient could be determined. It would be still more strikingly clear to the eye if the globe and tube were attached to the balance and the mercury reservoir fixed. In that case the globe of air would indeed rise with increase of heat, and the arrangement would become simply an apparatus for multiplying the effect of the rise, a rise of 2 inches with my apparatus being equivalent to a rise of about five hundred feet in nature. It thus becomes a comparatively simple means of conducting in the laboratory, operations which really take place on a large scale in nature.

CLIMATOLOGICAL DATA FOR JAMAICA.

Through the kindness of Mr. H. H. Cousins, chemist to the government of Jamaica and now in charge of the meteorological service of that island, we have received the following table in advance of the regular monthly weather report for Jamaica:

Comparative table of rainfall for June, 1903.

Divisions.	Relative area.	Number of stations.	Rainfall. 1903.	Rainfall. Average.
	Per cent.		Inches.	Inches.
Northeastern division	25	24	6.32	9.86
Northern division	22	53	5.16	4.80
West-central division	26	26	8.53	9.08
Southern division	27	36	3.99	5.72
	100	139	6.00	7.36

The rainfall for June was therefore much below the average for the whole island. The heaviest rainfall was 17.93 inches at Brownsville in the west-central division, while 0.48 of an inch fell at Port Royal Naval Hospital in the southern division.

TORNADO AT GAINESVILLE, GA., JUNE 1, 1903.

By Mr. J. B. MARBURY, Section Director, Atlanta, Ga.

On the afternoon of June 1 one of the most destructive tornadoes in the history of Georgia struck the outskirts of the City of Gainesville, in Hall County, about 50 miles northeast of Atlanta. The track of the storm was about 4 miles in length and from 100 to 200 feet in width.

The course taken was from southwest to northeast along the southern outskirts of the city, and was marked by death, destruction, and desolation.

The city proper is situated on an elevated plateau about 1300 feet above sea level, but the section passed over by the tornado runs northeast and southwest around the town, and is over 100 feet lower, forming a miniature valley-like depression with hills on either side. The devastated territory was occupied by several large cotton mills and the homes of employees and the negro element of the city. The fearful death list is due to the crowding together of so many persons employed in the doomed mills. Most of the negroes were away on a large picnic excursion, or the loss of life would doubtless have been doubled.

The weather map for the morning of the 1st presented no abnormal features, certainly nothing heralding any severe storms. Cloudy and unsettled weather covered the major portion of the country, and thunderstorms occurred at numerous points in middle and northern Georgia during the preceding night. The pressure was highest over the Great Lakes with the barometer 30.40 inches at Marquette, Mich. The lowest pressure east of the Rockies was in Missouri where it was but little lower than normal. The temperature was below 70°, except in the southeastern portion of this State.

During the early hours of the day the weather was somewhat erratic, alternating between sunshine and light showers with rather oppressive temperature. About noon heavy black clouds were seen forming in the southwest and soon continuous, though at first distant, thunder was heard. At the same time the wind blew briskly from the northeast, increasing in force as the clouds approached. A few moments later regular tornado clouds began forming, first in the southwest, and later in the west and northwest, in which was noticed what seemed to be a violent whirling motion; at the same time clouds were observed rushing in nearly all directions toward the tornadic disturbance. The tornado clouds were of the characteristic greenish hue, increasing in their horrible grandeur as they drew nearer. The clouds so closely resembled smoke that many thought it was smoke from an approaching locomotive; the cloud was approaching along the general direction of the Southern Railway. This appearance preceded by only a few seconds the development of the funnel-shaped cloud which